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Passed March 28th 1826

Heat,
a cause of bilious disorders.

By
Thomas Meaux
of
Virginia.

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Heat, a cause of bilious disorders.

No fact in medicine seems to be better established, than that marsh effluvia are the cause of bilious remittent fever: yet this and other bilious disorders occur in numerous instances, where, from the absence of sources of Miasmatic exhalations, we are induced to attribute them to other causes. Thus, when we witness their prevalence in an elevated and dry district of country, free from pools and marshes, we cannot fairly refer them to the agency of this silent and invisible foe; as it seems to be determined that exhalations cannot be wafted to a great distance, without being so diluted or dissipated as to render them innocuous. If, in these circumstances, long continued augmentation of heat has prevailed, our attention is irresistibly drawn to that agent as the pro-

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It is not designed to take it for granted that heat is certainly a cause of these diseases: but it will be proved that they have prevailed where it was the apparent and probable cause; and, next, an attempt will be made to explain the mode of its operations.

Perhaps it may not be amiss to state that the writer believed heat to be the cause of bilious fever, several years before he had the satisfaction of knowing that doctrine was taught in the University of Pennsylvania.

In the county of Caroline, Virginia, there is a considerable tract of country, immediately to the west of the great mail road, bounded on the north and south by the rivers Matapony and Northanna, tributaries of York river, which, during the hot and dry summers of 1822 and especially 1825, was visited by a prevalence and

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malignity of bilious diseases, unprecedented in the memory of the oldest inhabitants. It has been always esteemed a healthy country. The surface is undulating or hilly, and elevated. The soil is so silicious, that the inhabitants find much difficulty in procuring earth sufficiently clayey to make good bricks. About three fourths of the surface are cleared of woods, and nearly a half of that remaining is the secondary pine, a growth which indicates that the soil had once known the operation of the plough. Two small streams pass through this tract, with little low grounds on their borders.

Several strong circumstances interdict the belief, that bilious disorders arise, in this situation, from the agency of miasmata.

In the first place, the country is elevated and, consequently, enjoys a ventilation, which would wash away or dilute any pestilential emanation that

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might arise.

2dly The surface is undulating or hilly, causing a speedy passage to streams and redundant water from rains, thereby preventing the formation of marshes and stagnant pools.

3ly The sandy soil is pecuniary to the absorption of superabundant water from its porous nature; and, from the same cause, yields it, when operated on by the winds and rays of the sun, more readily than a soil of a different character; and, therefore, soon becomes dry. Besides, where it is covered with the native growth, we cannot suspect it of giving birth to that exhalation which arises from argillaceous woodlands.

4ly About three fourths of the tract are cleared of wood, and nearly a half of the remaining is the secondary pine, a growth which defends the earth very imperfectly from the action of the sun and winds, and whose leaves resist decay for years.

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in consequence of their resinous properties, and are therefore unlikely to give out offensive exhalations. The unusual proportion of cleared ground in this district of country, is owing to a well known circumstance in the early history of Virginia, which it may not be irrelative to mention here.

It appears, that, nearly a century since, the variety of tobacco called the sweettoothed, was in the greatest demand; and that the lands, watered by the branches of York river, produced it in the greatest perfection.

The consequence was, this country was extensively reduced to the plough, and nearly exhausted by the arduous cultivation of the plant.

Together with this clearing, which permits the winds to fan the country thoroughly, there is a thinning of vegetable matter, which would appear to secure the inhabitants from the influence of miasm, so far as the generation depends on a progress in the composition of the soil.

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On reviewing the circumstances of this section of country, not one will be found to support the idea, that the epidemics of 1822 and 1825 originated in miasm, unless the two small streams be considered its source, or that it was conveyed by the winds from a distance.

The justice of such a conclusion is rendered highly improbable by several facts. The tract alluded to is ten or twelve miles square, and the low grounds on the streams so narrow, that few proprietors find it their interest to reduce them to cultivation. So far as the laws which govern miasmata have been determined, that subtle matter can be conveyed but a short distance from the source of exhalation, before it is rendered inoffensive.

What then was the cause of these epidemics? and in what manner did this cause operate?



That the seasons were unusually warm, is a well known fact. That heat is an agent of powerful operation on the human system, is also a fact well established. That none of those exhalations, which have ordinarily been supposed to produce bilious diseases, existed in this tract of country, has been sufficiently shown. What then remains, but the conclusion, — a conclusion to which these facts irresistibly lead us, — that heat was the cause. The grounds of this conclusion will further appear, after we shall have considered,

In the second place, the mode of its operation.

It seems to be agreed upon by anatomists, that the arteries possess less of the elastic, and more of the muscular structure, as they recede from the heart, and approach their terminations. And as, throughout nature, wisdom and design are apparent,



and nature's God has formed naught in vain.
The conclusion appears legitimate and inevitable,
that this muscularity of the minute arteries is
for the purpose of carrying on the blood, when it
has reached so great a distance, or become so obstruct-
ed by the ramifications, as not to be under the
propelling action of the heart and larger arte-
ries, in a sufficient degree for the purposes of
circulation.

That debility and relaxation follow,
and are the consequences of the application of a ste-
mulant, and are generally in the ratio of its du-
ration and intensity, is as evident, and will be as
readily conceded, as, that heat is stimulant.

Hence it follows, that, when the system has been
long exposed to an unusual degree of heat, the
cutaneous capillaries are thrown into an undue
action; and when the excitability is worn down, a
muscular debility ensues, which deprives them, in

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the same ratio, of the power to perform their correlatory functions. In this state of things, their coats are relaxed and engorged; whilst the heart and larger arteries, which, from their structure and situation, are not directly exposed to the debilitating cause, surge on the blood, by the vis a tergo, through the now inert cutaneous capillaries. Now, the blood meeting with less resistance from the internal capillaries, which are exempt from the debilitating cause by their situation, an undue quantity is poured into the abdominal viscera, producing a morbid condition in these organs and their secretions; and, according to concurring circumstances, different diseases are developed. But, as the venous blood, returning from these viscera through the vena portarum, passes to the liver, this organ is the greatest sufferer.

An increased action is induced; and the bile is secreted in an undue quantity, and, probably, vitiated in quality, causing cholera, dysentery, or bilious



remittent fever, accordingly as the disease may be modified by the condition of the alimentary canal, or sanguiferous system, and other collateral circumstances.

An objection to the foregoing, it may be urged that the redness of the skin, during the continuance of warm weather, is evidence of an increased energy or action in the cutaneous capillaries. And, secondly, that the debility induced by hot weather, is universal, affecting the heart, no less than the muscles of locomotion, and the muscular structure of the minute arteries.

In answer to the first, it may be stated, that, in consequence of previous excitement, the vessels are superfluently relaxed and congested. If the redness be the effect of increased action, the action must be in proportion to the colour, which is frequently equal, or nearly so, to that of phlegmon, especially in the face. It would hence follow, that there



must be inflammation; a conclusion which no one would contend for.

To the second objection, it may be replied, that heat, as applied to the system, is relative.

If a portion of air at 98° were thrown into the rectum, it would not produce a sensation of heat, and would be inactive, as regarded its temperature, that being the degree of healthy animal heat at the source of circulation. But if the skin be exposed to an atmosphere of the same degree, a sensation of heat would be produced, with considerable increase of action in the minute cutaneous arteries, in consequence of their being unaccustomed to so high a temperature in the atmosphere. It therefore seems to follow, that, unless the atmosphere be above the temperature of the blood in the large arteries, there would not be excited to increased action, excepting through that wide dominion, which the skin, by its

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Some practical application should be a primary object in medical enquiry. He who holds the winds in his fist, can alone mitigate the ardour of our summers: yet science may do much to ward off the effects. Let our buildings be so constructed, as to defend us equally from the scorching sun, and chilling blast. Let every domicile be provided with a bath, cool or tepid, that the cutaneous capillaries may be daily invigorated by its use during the summer heats. But, above all, we must shake off the social thralldom under which we labour in sleep, borrowed, for the most part, from a country much cooler than our own, and adopt one, in fashion and fabric, suited to the ardour of our climate.

Then, the black-lettered catalogue of mortality would not be so often swelled by bilious disorders.

